

2.4

Identify Zeros and End Behavior and Graphing

Name _____ Period _____ Date _____

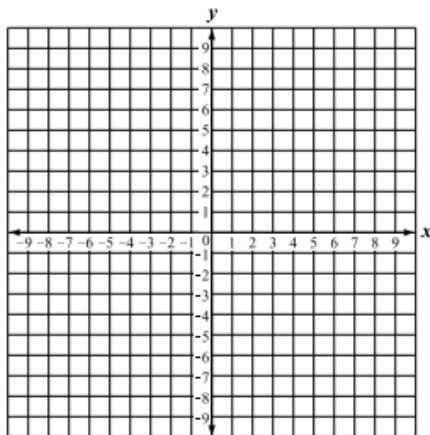
Without using technology, sketch each polynomial. (Hint: Identify the zeros, their multiplicity, determine whether they touch or cross the x -axis at each zero and describe their end behavior.)

1. $f(x) = (x + 1)(x - 1)(x - 3)$

Zeros	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

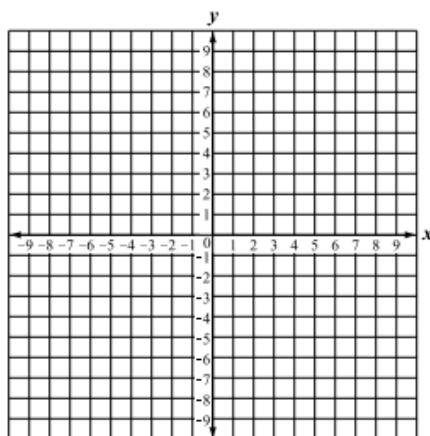


2. $f(x) = -x^2(x + 3)(5x - 4)$

Zeros	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

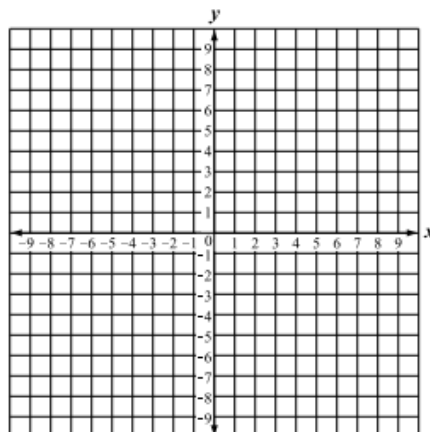


3. $f(x) = (x + 4)(x + 1)(x - 2)(x - 3)$

Zeros	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

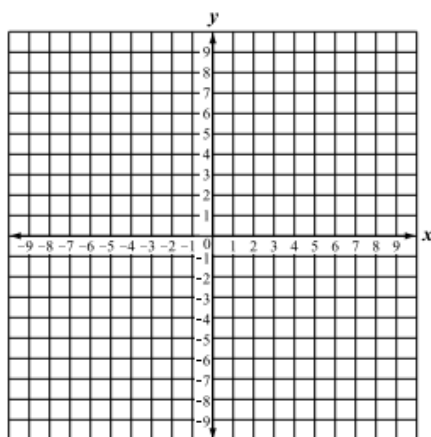


4. $f(x) = -(x + 1)(x - 3)^2$

Zeros	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

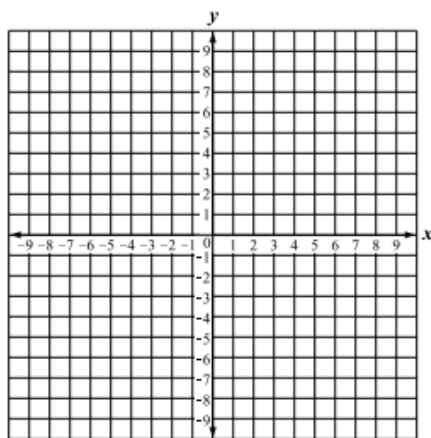


5. $f(x) = (x - 1)^3(x + 2)^2$

Zeros	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

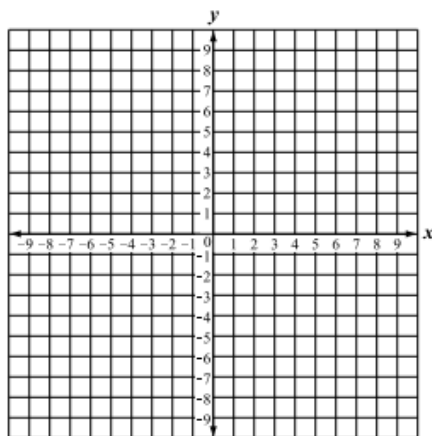


6. $f(x) = -(x - 2)^3(x + 1)$

Zeros	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$



Match the polynomial function with its graph (without a graphing calculator!). Explain your choice.

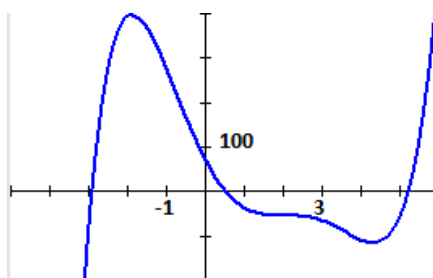
7. $f(x) = 7x^3 - 21x^2 - 91x + 104$

8. $f(x) = -9x^3 + 27x^2 + 54x - 73$

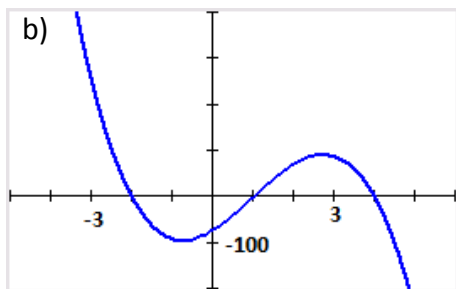
9. $f(x) = x^5 - 8x^4 + 9x^3 + 58x^2 - 164x + 69$

10. $f(x) = -x^5 + 3x^4 + 16x^3 - 2x^2 - 95x - 44$

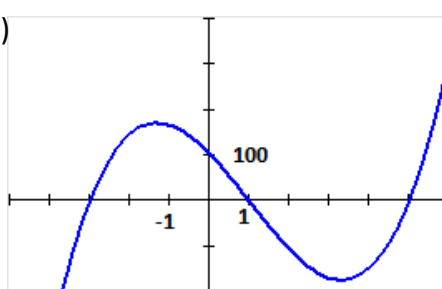
a)



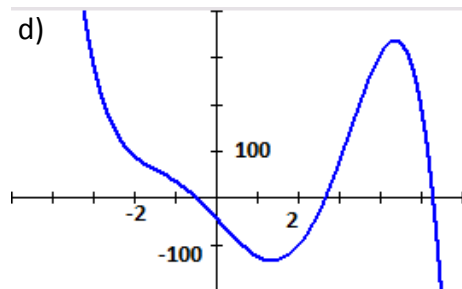
b)



c)



d)



Use technology to graph the polynomial. Identify the zeros, their multiplicity, determine whether they touch or cross the x-axis at each zero and determine the end behaviors.

11. $f(x) = x^6 - 2x^5 - 5x^4 + 4x^3 + 7x^2 - 2x - 3$

$\lim_{x \rightarrow \infty} f(x) =$ $\lim_{x \rightarrow -\infty} f(x) =$

Zeros	Multiplicity	Touch/Cross

12. $f(x) = x^3 + x^2 + 4x + 4$

$\lim_{x \rightarrow \infty} f(x) =$ $\lim_{x \rightarrow -\infty} f(x) =$

Zeros	Multiplicity	Touch/Cross

Practice Problems

Use factoring or the remainder theorem to determine which of the binomials listed are factors of the given polynomial. Show work!

13. $f(x) = x^2 - 3x + 2$

a. $x + 2$

b. $x - 2$

c. $x - 1$

14. $f(x) = x^3 - 2x^2 - 5x + 6$

a. $x + 2$

b. $x - 1$

c. $x + 9$

Factor each polynomial. Use polynomial identities if necessary. Show work!

15. $9y^2 - 16$

16. $9z^2 - 24z + 16$

17. $64z^3 + 27$

18. $2x^3 - 3x^2 + 2x - 3$

19. $3k^2 - 19k + 20$

20. $121n^2 - 4$

21. $25a^2 + 30a - 135$

22. $20x^2 - 70xy$